

REMARKS

In accordance with the foregoing, the specification and claim 1 have been amended and new claim 15 has been added. Claims 1-8 and 10-15 are pending and under consideration.

Antecedent basis for new claim 15 can be found, for example, at page 22, lines 13 and 14; page 46, line 6; page 55, line 23 – page 56, line 2; page 64, lines 22 and 23; and page 65, line 1.

With regard to the specification change to page 28, lines 9 and 10 of the specification, the amendment is to correct a translation error. Clear antecedent support can be found elsewhere in the application, for example, at page 18, lines 4-6 and page 28, lines 12-15. With regard to the specification amendment at page 80, line 18, antecedent basis can be found, for example, at page 20, lines 5-7.

Before addressing the new prior art rejections raised in the Office Action, Applicants would first like to comment on the Examiner's "Response to Arguments" beginning at page 7 of the Office Action. The Examiner notes an obvious typographical error in Table 8, which Applicants submitted together with a Declaration under 37 C.F.R. §1.132. Specifically, Table A listed the number average particle diameter for various particles. Table A gave the units for the number average particle diameter in millimeters. On the other hand, as noted by the Examiner, the correct units for the number average particle diameter are microns. As the Examiner appears to appreciate, this is clearly a typographical error. A replacement sheet for Table A is enclosed herewith. The replacement sheet shows the correct units "µm" for the number average particle diameter. It is requested that the replacement sheet for Table A be placed with the file. If the Examiner believes that a replacement Declaration is necessary to clarify the file history, the Examiner should notify the undersigned. A replacement Declaration will be promptly filed.

Claims 1-5 and 8-14 are rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 5,798,202 to Cushner et al., U.S. Patent Publication No. 2001/0044076 to Hiller et al., an excerpt from the Asahi Glass website pertaining to SUNSPHERE™ particles and U.S. Patent No. 6,399,270 to Mori et al. For claims 5-7, the Examiner relies upon these four references and two additional references, U.S. Patent Publication No. 2002/0045126 to Watanabe et al. and U.S. Patent No. 5,851,649 to Mohri et al.

Cushner et al. is directed to a laser engravable printing element which comprises a laser engravable, reinforced elastomeric layer which has been singly reinforced mechanically or thermochemically, or multiply reinforced mechanically and photochemically, mechanically and thermochemically, or photochemically and thermochemically, or mechanically, photochemically and thermochemically (see claim 1 of Cushner). Mechanical reinforcement is accomplished by

incorporating a reinforcing agent into the elastomeric material used for forming the printing element. With respect to the reinforcing agent, the following description is found at column 4, line 61 to column 5, line 11 of Cushner:

It will be understood that the additives which can be used as reinforcing agents will vary depending on the composition of the elastomeric material. Thus, materials which are reinforcing agents in one elastomer, may not function as reinforcing agents in another elastomer.

The reinforcing agent is, generally, a particulate material, although not all materials can serve as a reinforcing agent. Selection of a suitable reinforcing agent depends on the elastomeric material. Examples of such agents can include but are not limited to finely divided particles of carbon black, silica, TiO₂, calcium carbonate and calcium silicate, barium sulfate, graphite, mica, aluminum and alumina. ..." (emphasis added).

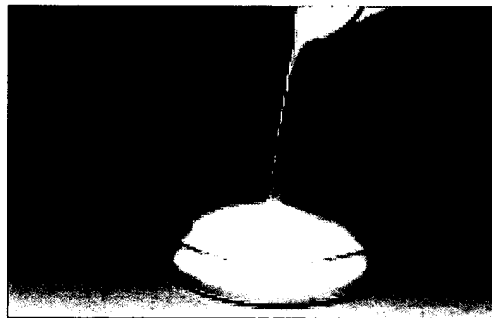
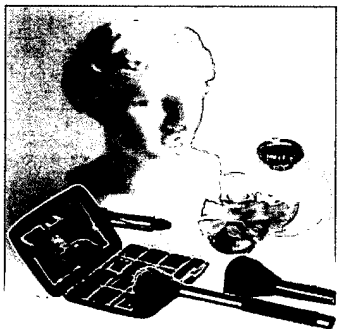
The Examiner admits that Cushner does not suggest the claimed inorganic particles or their properties. The Examiner cites the SUNSPHERE particles described in the Asahi Glass website for this deficiency. The SUNSPHERE particles were previously described in Table A, which Applicants submitted with their Declaration under 37 C.F.R. §1.132. However, the citation of these particles in the Declaration is in no way an admission of prior art. These particles were cited simply to show that the Examiner's alleged relationship between the pore diameter, pore volume and particle diameter is incorrect. To do this, the properties of commercially available particles were presented to the Examiner.

The Asahi Glass Company "AGC" website cited by the Examiner is an online catalog for SUNSPHERE series particles. This catalog was printed on January 4, 2008. On the other hand, the present invention has a 2002 priority date. Referring to page 4 of the excerpt cited by the Examiner, the website has a copyright date of 1996 to 2007. Accordingly, it appears that some form of this website was available over a 10 year period. A large part of this 10 year period is after the priority date of the subject application. One would expect that during this extended time period, there were numerous revisions to the website. The Examiner has made no showing that the SUNSPHERE particles were available since 1996. Accordingly, it is respectfully submitted that the Examiner has not presented a *prima facie* case that the SUNSPHERE particles pre-date the invention.

Even assuming that the Examiner were correct, the claims still patentably distinguish over the references cited by the Examiner. On page 3 of the Office Action, the Examiner asserts that "[i]t would have been obvious to one of ordinary skill in the art to use the SUNSPHERE

particles in the composition of Cushner because Asahi Glass teaches that the particles are conventionally used as a resin filler.” Applicants submit that the applications described for SUNSPHERE particle are vastly different from the laser engravable printing element described in Cushner et al. Applicants submit that without Applicants’ notation of the SUNSPHERE particles, the Examiner would never consider using the SUNSPHERE particles together with the printing element described in Cushner et al. (and this assumes that the Examiner has a need for a reference disclosing such particles). It is further submitted that the Examiner cited the SUNSPHERE particles using hindsight based on, not only the present application, but also Applicants Declaration under 37 C.F.R. §1.132.

A closer view of the SUNSPHERE website will show the vast differences from the Cushner reference. The website shows two photographs of uses for the SUNSPHERE particles, reprinted below:



One of ordinary skill in the art would see the particles being used for cosmetics and for a gel powder. The website describes the particles as “beautiful” and “smooth to touch.” Certainly, these are not properties that one looks for when making a printing element. The website also describes that the particles can be used for cosmetics, a catalyst support film, a matting agent for paint and coated printing papers. It is submitted that leather, paint and cosmetics have nothing to do with a laser engravable printing element.

The website further describes that the perfect spherical shape is the secret of the tactile appeal for the SUNSPHERE particles. Again, tactile appeal is not something people are looking for in preparing a printing element.

In referring to the use as a resin filler, the Examiner is apparently citing page 2 of the website which describes the follow uses.

- Cosmetics and Toiletries:

Improves the feeling of foundation, make-up

- Drug Carriers and Release Carriers:

products.

Absorbed in SUNSHERE active, functional ingredients are solidified and improve feeling in use.

Used for solidify liquid agents.

Used for the encapsulation and slow release of liquid and solid agents and fragrances.

Used as catalyst carrier.

- Resin Filler:

Used for surface smoothing and improved fluidity, anti-blocking, and as moisture absorbent.

- Paints and Inks:

Used in coating media for ink-jet printers.

- Others:

A number of special properties can be imparted by the appropriate surface treatment.

Used to improve the fluidity powders.

Taken as a whole, these uses describe that the particles provide a smooth feeling to liquids, absorb moisture and help solidify drugs. Again, it is submitted that, taken as a whole, the applications are very different from a printing element. It is submitted that one of ordinary skill in the art would not consider the SUNSPHERE particles in an effort to improve the teachings of Cushner et al. (assuming that the SUNSPHERE particles were in fact available before the date of the invention).

Even if the SUNSPHERE particles were available, and one of ordinary skill in the art would consider incorporating them into Cushner et al., Cushner et al. teaches away from this combination. Specifically, as described above, Cushner et al. teaches that silica particles can be used as long as they provide the reinforcing properties described in Cushner et al.

Cushner et al. describes that selecting a reinforcing agent for the printing element depends on the type of the resin used, and not all particulate material is capable of functioning as a reinforcing agent. In other words, not all combinations of a resin and a reinforcing agent are effective for producing a laser engravable printing element.

Although silica particles are described as an example of a reinforcing agent, the only reinforcing agent used in the working examples of Cushner is carbon black. Therefore, Cushner only teaches that the specific combinations of an elastomeric resin and carbon black described in the working examples are useful for producing a printing element. Cushner et al. describes no guidelines for selecting a resin which can be used in combination with silica particles for producing a printing element. Since Cushner clearly teaches the "reinforcing agents in one

elastomer may not function as reinforcing agents in another elastomer", there is no description in Cushner which motivates a skilled person to combine the silica particles of AGC website with a resin which is not described in Cushner, namely the resin of Hiller or Mori.

Moreover, SUNSPHERE particles of the AGC website are porous silica particles and such porous particles are not suitable for use as a reinforcing agent. In the outstanding Office Action, the Examiner states that "it would have been obvious to one of ordinary skill in the art to use the SUNSPHERE silica particles with an average particle diameter of 200-500 Å (0.02-0.05 µm) or even smaller to optimize the number average particle diameter and enhance the tensile strength, abrasion and tear resistance, hardness and toughness, are enhanced with decreasing particle size" (see page 3, lines 14-18 of the outstanding Office Action). However, particle size is not the only factor which determines the strength of particles. It is well known in the art that porous particles are not suitable as a reinforcing agent because porous particles are weaker than non-porous particles. To demonstrate that porous particles are weak as compared to non-porous particles, the Applicants submit herewith Exhibit 3 which is "Seramikusu no Kagaku (Chemistry of Ceramics)" published by Maruzen Kabushiki Kaisha, Japan in 1993 with a partial English translation thereof. According to Exhibit 3, porosity and particle diameter are two factors which influence the strength of ceramics and the increase of porosity causes the strength of ceramics to decrease exponentially (see item (2) of Exhibit 3).

As apparent from Exhibit 3, particle size is not the only factor which controls the strength of inorganic particles. Non-porous particles which are stronger than porous particles are suitable as a reinforcing agent for a resin composition. Therefore, a skilled person having a general knowledge of the art would have been motivated to use commercially available non-porous silica particles instead of SUNSPHERE porous silica particles shown in the AGC website as a reinforcing agent for mechanically reinforcing the printing element of Cushner.

In accordance with the foregoing, it is submitted that independent claims 1 and 12 patentably distinguish over the references cited by the Examiner. Claims 2-8, 10, 11, 13 and 14 depend directly or indirectly on independent claim 1 or 12 and include all the limitations of the respective independent claim and additional patentable limitations. For example, independent claim 3 recites at least 30% by weight of the resin (a) is selected from the group consisting of a thermoplastic resin having a softening temperature of 500°C or less and a solvent-soluble resin. The Examiner addresses the limitations of dependent claim 3 by citing Mori. However, the Examiner is requested to note that Mori relates to a photolithographic printing plate, whereas Cushner et al. relates to a laser engravable printing plate. Very different processes are used to form a relief pattern on a photolithographic plate and a laser engravable printing plate.

Photolithography involves depositing and developing a mask with a photo process. Then, material is removed by etching or some other process. On the other hand, a pattern is formed on the printing element of Cushner et al. using laser engraving. One of ordinary skill in the art would not believe that a photolithographic printing plate could be used with laser engraving. It is submitted that the combination suggested by the Examiner would not have been obvious.

With regard to dependent claim 10, this claim recites that the printing element comprises a printing element layer and at least one elastomer layer provided below the printing element layer, the elastomer layer having a Shore A hardness of from 20-70. For this claim, the Examiner cites the Shore hardness described in Cushner et al. However, the claimed Shore A hardness relates to an elastomer layer, not the printing element layer. As the title indicates, Cushner et al. is a single layer printing element. The elastomer layer described beginning at Cushner et al., column 1, line 50 is the printing element layer. Column 2, lines 54-59 describe that the term "single layer" means that a single reinforced elastomeric layer is used. The Examiner has not cited any reference showing a printing element layer and an elastomer layer, the elastomer layer having a shore A hardness of from 20-70.

In view of the foregoing amendments and remarks, it is submitted that the prior art rejection should be withdrawn. There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

Respectfully submitted,

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Table A

Item	Tradename of inorganic particles	Number average particle diameter (μm)	Average pore diameter (nm)	Pore volume (ml/g)	Specific surface area (m ² /g)	Oil absorption value (ml/100 g)
[1]	SOC-NPS-6MG (50) *3	0.1	1.6	2.0	1000	not determined
[2]	M.S.GEL EP-DF-3-1000AW*2	2.4	113	0.6	22	160
[3]	SYLYSIA 710*1	2.8	2.5	0.44	700	100
[4]	Silton AMT25*4	2.9	none	0.006	2.3	40
[5]	SUNSPHERE H31*2	3.0	5	1.0	800	150
[6]	SUNSPHERE H33*2	3.0	30	2.0	700	400
[7]	M.S.GEL EP-DF-3-2000AW*2	3.0	200	0.7	14	190
[8]	M.S.GEL EP-DF-3-1500AW*2	3.2	154	0.7	18	180
[9]	SYLYSIA 550*1	3.9	7	0.8	500	160
[10]	SYLOSPHERE C-1504*1	4.5	12	1.5	520	290
[11]	Silton JC50*4	5.0	none	0.02	6.7	45
[12]	SYLYSIA 250USA*1	5.7	24	1.8	300	310

*1: manufactured and sold by FUJI SILYSIA CHEMICAL LTD.

*2: manufactured and sold by AGC Si-Tech. Co., Ltd.

*3: manufactured and sold by SUMITOMO OSAKA CEMENT Co., Ltd.

*4: manufactured and sold by Mizusawa Industrial Chemicals, Ltd.

セラミックスの化学

第2版

柳田 博明 編

セラミックスの化学

第2版

柳田 博明 編著



丸善

丸善株式会社

このように、強度は K_{Ic} とともに、亀裂の有無と大きさによって支配されている。そのため、セラミックスを機械材料として用いるさいには、亀裂を生むキズの探査が重要な評価事項となり、またその作製にあたっては、キズのない緻密で均質な微細構造とすることが重要となる。

セラミックスの微細構造が強度に及ぼす因子として、気孔率と粒径がある。気孔率が増大すると、強度は指数関数的に低下する。いくつかの式が提案されているが、次のような式がよく用いられる。

$$\sigma_r = \sigma_0 \exp(-bp)$$

ここで、 p は気孔率、 b は定数、 σ_0 は $p=0$ における強度である。アルミナでの例を図 4.44 に示す。また、粒径が大きいと強度の低下がみられ、次のような粒径 d の平方根に反比例する関係が見出されている。

$$\sigma_r \propto d^{-1/2}$$

これは、粒子内に亀裂が生じた場合、その亀裂は粒界で進展が止まり、応力は粒界を通して分散されるためと説明されている。また、粗大粒子があると、焼結後の冷却過程で熱応力により粒界に亀裂が生じやすく、大きな強度低下をまねく原因となる。

多くのセラミックスやガラスは腐食性雰囲気中で応力を加えられると、臨界応力以下でもゆっくりとした亀裂の成長が起こる。

応力拡大係数とクラック成長速度との間には図 4.45 のような関係があり、三つの領域が見出される。領域 I はクラック先端での応力腐食が律速段階であり、II では腐食成分のクラック先端への拡散が律速、III では腐食反応と機械的な破壊が共存する。図より、領域 I では同じ材料に対し、腐食成分の濃度によってクラッ

表 4.12 各種セラミックスおよび金属の破壊靱性値

材 料	K_{Ic} [MPa m ^{1/2}]	材 料	K_{Ic} [MPa m ^{1/2}]
Al ₂ O ₃	4~4.5	SiC	3.5~6
Al ₂ O ₃ -ZrO ₂	8~10	Si ₃ N ₄	5~8
ZrO ₂	1	B ₄ C	5~6
ZrO ₂ -Y ₂ O ₃ (正方晶)	6~10	サイアロン	5~7
ZrO ₂ -CaO (析出強化)	8~10	鉄鋼 (高強度)	40~90
ZrO ₂ -MgO (析出強化)	5~6	チタン合金	70

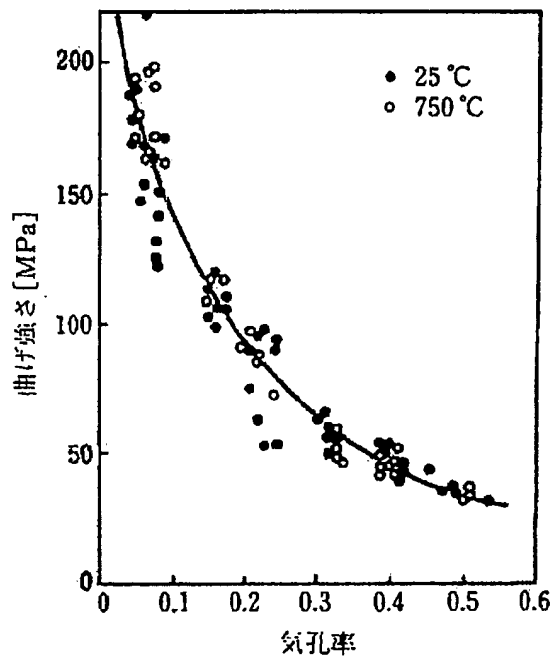


図 4.44 Al_2O_3 の気孔率と曲げ強さ
R.L. Coble, W.D. Kingery, *J. Am. Ceram. Soc.*, 39, 377(1956).

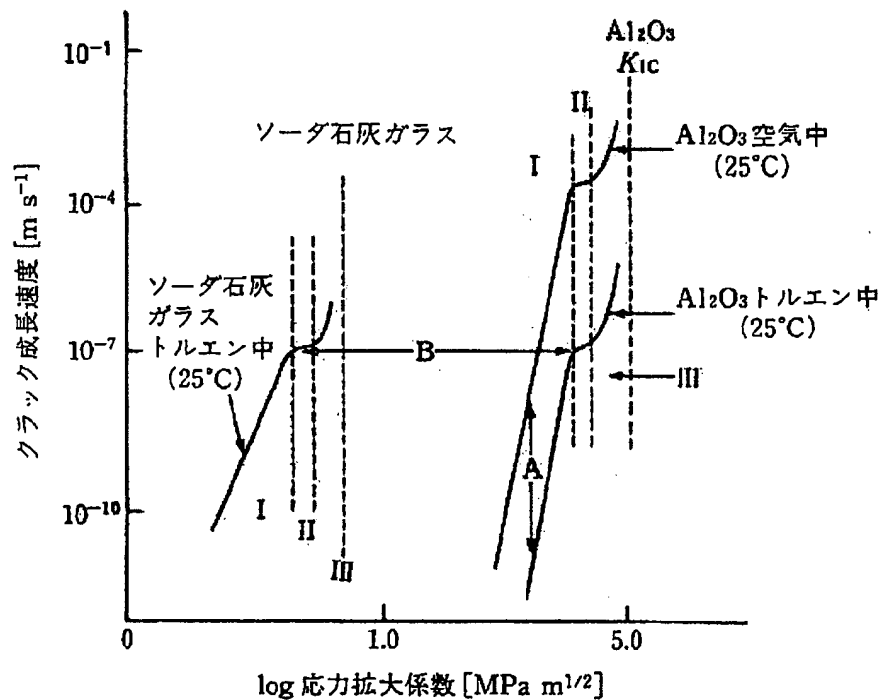


図 4.45 セラミックスに加えられた応力と傷の成長速度との関係

ク成長速度は大きく値が変わることがわかる(図中 A の関係)。しかし、領域 II では腐食成分の濃度が一定であれば、材料の種類が変わってもクラック成長速度は同じとなる(図中 B の関係)。

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Exhibit 3

"Seramikusu no Kagaku (Chemistry of Ceramics) published
by Maruzen Kabushiki Kaisha, Japan in 1993 and
Partial English translation thereof

(1) Cover Page:

Chemistry of Ceramics

2nd Ed.

Hiroaki Yanagida Ed.

Maruzen Kabushiki Kaisha

(2) Page 238, lines 5 to 16:

Porosity and particle diameter are features of ceramic microstructure which influence the strength of ceramics. Increase of porosity causes an exponential decrease of strength. Several formulae have been proposed, and the following formula is commonly used to represent this relationship:

$$\sigma_f = \sigma_0 \exp(-bp)$$

wherein p represents porosity, b represents a constant, and σ_0 represents strength when $p = 0$. The values for alumina are exemplified in Fig. 4.44. Further, when the pore diameter is large, there is a decrease in the strength of ceramics and this relationship is represented by the following formula, wherein the strength is inversely proportional to the square root of particle diameter d .

$$\sigma_f \propto d^{-1/2}$$

This relationship is explained by the fact that, when cracks are formed in a particle, the progression of the cracks stops at the particle boundary of the particle and the stress applied to the particle is dispersed through the particle boundary. Further, when coarse particles are contained in ceramics, cracks are likely to be formed at the particle boundary due to thermal stress which is applied during the cooling step performed after calcination. This causes a large decrease in the strength of such ceramics.

(3) Page 239, Fig. 4.44:

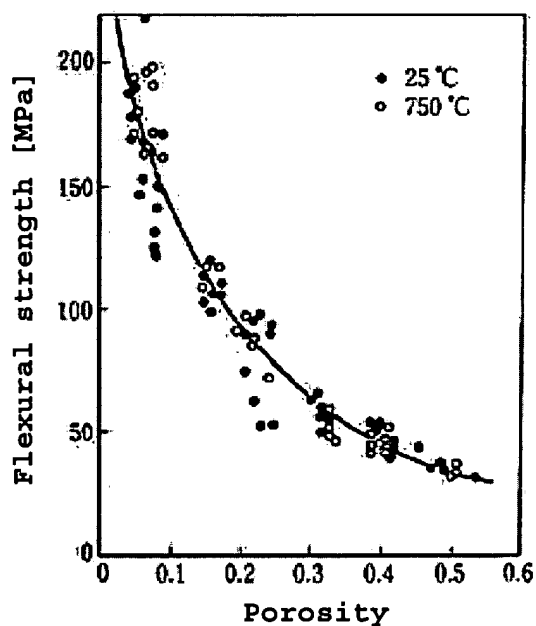


Fig. 4.44 Porosity and flexural strength of Al_2O_3
R.L. Coble, W.D. Kingery, J.
Am. Ceram. Soc., **39**, 377 (1956)

(4) Colophon:

Chemistry of Ceramics 2nd Edition

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